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NEW HAMPSHIRE COLLEGE

AGRICULTURAL EXPERIMENT STATION

TWO SHADE-TREE PESTS

BY CLARENCE M. WEED

NEW HAMPSHIRE COLLEGE

OF

AGRICULTURE AND THE MECHANIC ARTS

DURHAM, N. H.

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The Bulletins of this Station are sent to any resident of New Hampshire upon application.

TWO SHADE-TREE PESTS

BY CLARENCE M. WEED

I. THE WHITE-MARKED TUSSOCK MOTH.

During the early part of the past summer the elm trees of Manchester were seriously attacked by the caterpillars of the White-marked Tussock moth[1]—an insect that has long been known to injure elms in cities. The pest is also present to a greater or less extent in various other parts of the state. To acquaint the public with its habits and the methods of destroying it, the following account is published.

If the elm trees in northern localities infested by this insect be examined any time from late summer until early the following spring, one will see scattered here and there upon the bark of the trunk and larger branches, whitish patches, easily visible some distance away. On closer examination these patches will be found to consist of thin, grey cocoons attached to the bark, many of which will be partially covered with large, glistening white masses, suggestive of dried froth, which, if broken open, will be found to contain hundreds of small, white, spherical eggs, held together by the froth-like substance that permeates the whole mass. If the cocoon itself be pulled apart, there will be found within it an empty brown pupa shell, from which the moth emerged.

Should you leave one of these egg-masses in place on the tree, and watch it in spring, you would see sometime in May, or early June, soon after the leaves burst through the buds, hundreds of tiny hairy caterpillars come forth from the mass, and crawl along the bark toward the leaf-bearing branches.

[1] *Orgyia leucostigma.*

When the latter are reached, each caterpillar begins feeding upon the succulent green portions of the leaf. The young caterpillars are about one-sixth of an inch long, and thickly covered on the back and sides with dark brown hairs. At the end of a week the larvae, as these caterpillars are often called, shed their skins, crawling out clothed in a new covering previously formed beneath the old one. They continue feeding soon after this first molt, and a week or two later again shed their skins to provide for their increase in size. After another period of feeding a third molt takes place; the caterpillars have by this time become about an inch long, and are handsome creatures.

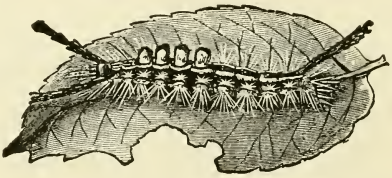

Fig. 1.—Caterpillar of Tussock Moth. (After Riley.)

The general color is yellow: the head and two tubercle-like projections on the hinder portion of the back are bright coral red; there are four cream colored tufts of hair along the back. Two long black plumes project forward from just behind the sides of the head, and another projects backward from the posterior end of the body. Along each side of the back there runs a distinct yellow line; and lower down the sides there is another yellow line, generally less distinct.

About a week after the third molt a large proportion of the caterpillars desert the leaves and seek the rough bark of the trunk, where they spin loose, brownish, silken cocoons, within which they transform to the pupa or chrysalis stage. These are the caterpillars which are to develop into male moths. The other caterpillars remain upon the leaves, feeding freely and undergoing one or two additional molts as larvæ before spinning cocoons. They finally spin up, however, in situations similar to those selected by the males and change into brown chrysalids. When full grown they are much larger than were the fully

developed male caterpillars, and the chrysalids of the females are also much larger. (Fig. 2, *c*.)

About a fortnight after the caterpillars pupate they again transform and emerge as moths. The two sexes of these differ greatly : the males (Fig. 2*e*) have wings, well developed feathery antennæ, and the front legs thickly furnished with hair. "The general color is ashy-gray, the front wings being crossed by undulated bands of darker shade, with two black markings on the outer edge near the tip, and a white spot on the inner edge, also near the tip. He may frequently be seen sitting on the trunks of trees, or on the shady side of houses, etc., as he rests during the day, and flies only after dusk, often being attracted by light The female (Fig. 2*a*) is totally different from the

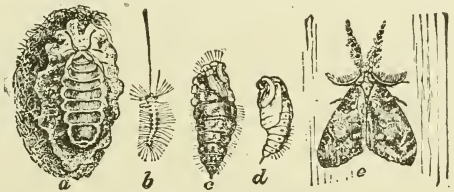

Fig. 2—White-marked Tussock-moth: *a*, female moth on cocoon; *b*, young larva hanging by thread; *c*, female pupa; *d*, male pupa; *e*, male moth.

male in appearance and resembles a hairy worm rather than a moth, since she possesses the merest rudiments of wings. She is of a pale gray color, the antennæ being short and not feathered, the legs rather slender and not covered with long hairs." (*Riley.*) In consequence of her wingless condition the female cannot fly ; after emerging from the chrysalis she crawls upon the top of the cocoon where, after mating with the male, she deposits her eggs in a single mass, and soon after dies.

NUMBER OF BROODS

In New England as a rule there appears to be but one brood a year of the Tussock-moth Caterpillars. These mature about mid-summer, spin cocoons and become moths late in July or early in August. The eggs are at once deposited, to remain unhatched until the following spring. Further south there are two broods.

NATURAL ENEMIES

Fortunately this insect is attacked by a number of parasites that help greatly in checking its increase. A careful study of the infested elms in Manchester, made by the writer in August, showed that at least ten per cent. of the caterpillars had been killed by parasites. This is a hopeful sign for the future, for it shows that if the people will do their part in cleaning off the egg cases, the parasites will help to destroy those that escape. But the parasites are not sufficiently numerous for the public to leave the work entirely to them.

REMEDIES

The simplest and most effectual method of checking the injury of this insect is to pick off and destroy the egg masses during autumn, winter, or spring. There is a long period in which the insect is open to attack by this method; and if the owners of trees generally would employ it, there would be little trouble from the pest. In New Hampshire it appears advisable not to collect the egg masses until October or November, in order to permit the useful parasites to mature and escape. It is a simple matter to collect the egg masses on the lower portions of the trunks, but higher up and on the larger branches they are more difficult to reach. But by means of ladders, or climbing irons, or agile boys, the difficulty may be overcome. After the masses are collected, they may readily be burned.

At the time indicated it is necessary to collect only those cocoons which have egg masses upon them. Other cocoons are empty or contain parasites.

These insects may also be destroyed by spraying the trees early in summer, after the caterpillars have hatched, with Paris green in water, at the rate of four or five ounces of poison to fifty gallons of water. Directions for spraying have been given in previous publications of this station. For shade trees attacked only by Tussock caterpillars, the method of collecting the eggs is believed to be preferable to spraying.

II. THE SUGAR MAPLE BORER

From Concord, Hanover, and other places in the central region of the state, there has been considerable complaint regarding a borer in maple trees. Affected trees looked unhealthy, having yellowed foliage and little of it; after midsummer the bark of the trunks showed holes as large around as a lead-pencil. The injury was easily identified as that of the insect long known as the Sugar Maple Borer.* This is no new enemy to the maples of this state; in 1828, Rev. L. W. Leonard of Keene, New Hampshire, studied the insect and gave the first account of its life-history to Dr. T. W. Harris, the author of the classic Insects Injurious to Vegetation. Since that time it appears to have been present throughout most of New England to a greater or less extent.

The adult or perfect insect of this maple borer is a large and handsome beetle, of the shape and size represented in Fig. 3. It is about an inch long, with a rounded body and rather long feelers or antennæ. "The head," writes Dr. Harris, "is yel-

Fig. 3. Beetle of Maple Borer. (After Saunders).

low with the antennæ and the eyes reddish-black; the thorax is black, with two transverse yellow spots on each side; the wing covers for about two-thirds of their length are black; the remaining third is yellow, and they are ornamented with bands and spots arranged in the following manner: a yellow spot on each shoulder, a broad, yellow, curved band or arch, of which the yellow scutel forms the keystone on the base of the wing-covers; behind this is a zig-zag yellow band, forming the letter

* *Glycobius speciosus.*

W, across the middle another yellow band arching backwards, and on the yellow tip a black, curved band and spot; the legs are yellow; and the under side of the body is reddish-yellow, variegated with brown."

These beetles come forth from their burrows in the tree during July and August. During the latter month they lay eggs in the bark of sugar maples, selecting almost any part of the trunk for this purpose. In a short time—perhaps a week—these eggs hatch into small larvæ or grubs that burrow obliquely upward through the bark; their progress is slow, and more

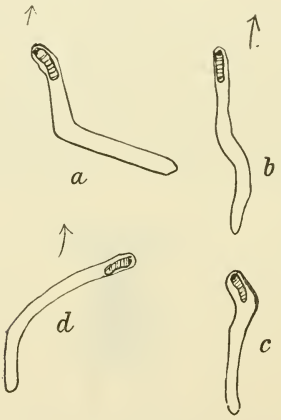

Fig. 4. Mines of young Maple Borers. (After Packard).

or less "frass" or castings are thrown out of the outer hole as they proceed. On this account the location of the little borers can generally be determined by looking the trees over carefully. The larvæ do not get beyond the bark the first autumn, and remain in their shallow burrows until the following spring. Then they burrow deeper into the solid wood of the tree, which thereafter they mine in all directions, the burrows growing larger as the insect increases in size. Finally

the grub becomes full grown in this larval stage; it is now a large, white, legless creature, with the body composed of many distinct rings or segments. It makes a cell near the outer part of the tree in which it changes to the pupa or chrysalis state; and finally again changes into an adult beetle, which comes forth in July and August to continue the propagation of the species.

This insect appears to confine its injuries to the sugar maple *(Acer saccharinum)*, apparently, seldom, if ever, attacking the red maple. Further observations upon this point, however, are desirable.

REMEDIES

As already indicated, the entrance of these borers is generally shown by the brownish, saw-dust like castings thrown out of the hole, and the larvæ remain in the shallow bark from September until the following spring. Consequently they can easily be cut out with a sharp knife, during autumn, winter, or spring, with little or no injury to the tree. This appears to be the most practical method of destroying them. Of course the beetles and older larvæ should be killed when found, and maple trees so seriously injured by this insect or from other causes as to show evident signs of dying should be cut down and converted into firewood,—the wood to be burned before summer so that the larvæ present shall not mature,—rather than be left standing to serve as breeding grounds for the pests.

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